Connecticut Department of Energy and Environmental Protection

Connecticut Department of
ENERGY & ENVIRONMENTAL PROTECTION

GC3 Meeting

November 27, 2017
3:00 — 5:00 p.m.

Agenda

3:00	Welcome & Announcements *Rob Klee, DEEP Commissioner & GC3 Chair*
3:05	Variations to technology penetration rates by sector focusing on 45% mid-term scenario *Jason Rudokas, NESCAUM*
3:25	Discuss mid-term GHG reduction target *Facilitated by Rob Klee, DEEP Commissioner & GC3 Chair*
4:30	Public comments

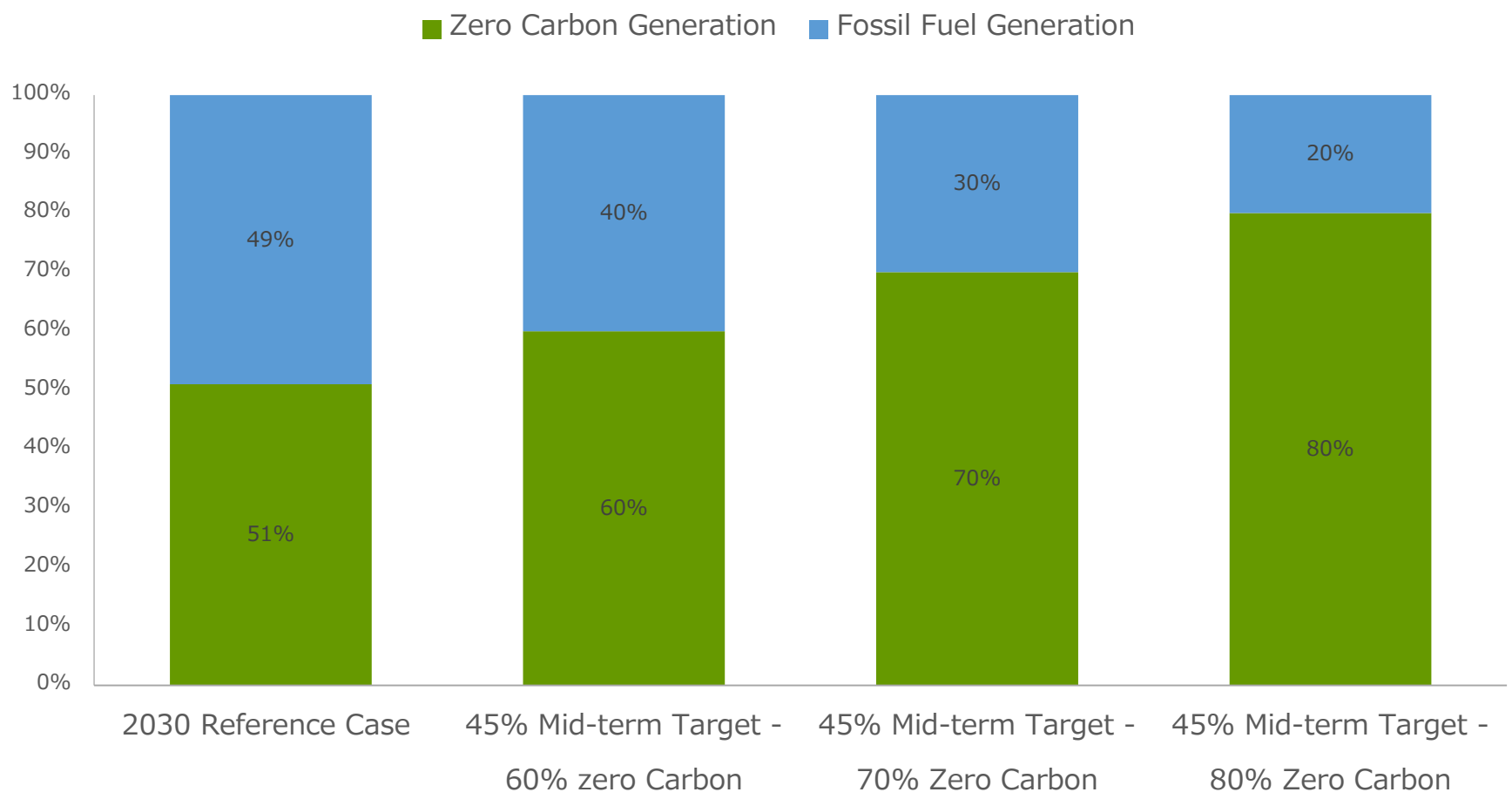
Variations to technology penetration rates by sector focusing on 45% mid-term scenario

Jason Rudokas, NESCAUM

Renewable Electric Generation Assumptions

- Baseline 45% mid-term reduction scenario assumes 60% zero carbon by 2030
- Sensitivity 1: 70% Zero Carbon by 2030
- Sensitivity 2: 80% Zero Carbon by 2030
- Two variations:
  - As zero carbon generation increases, back off renewable thermal tech penetration more than clean transportation
  - As zero carbon generation increases, back off renewable thermal penetration and clean transportation equally

Scenarios for Electric Power Generation Mix



Residential & Commercial Renewable Thermal*

Variation 1 (backing off RR* more than transport)

	45% 2030 Mid-Term Target (60% zero carbon)	Sensitivity 1 (70% zero carbon)	Sensitivity 2 (80% zero carbon)
Residential % of Thermal Load	29%	15%	8%
Commercial % of Heated Sq. ft.	22%	8%	3%

Variation 2 (backing off RTT* and transport equally)

	45% 2030 Mid-Term Target (60% zero carbon)	Sensitivity 1 in 2030 (70% zero carbon)	Sensitivity 2 in 2030 (80% zero carbon)
Residential % of Thermal Load	29%	19%	13%
Commercial % of Heated Sq. ft.	22%	13%	7%

*RTT (renewable thermal technologies)refers to air and ground source heat pumps.

Electrification of Passenger Vehicles

Variation 1 (backing off RTT more than transport)

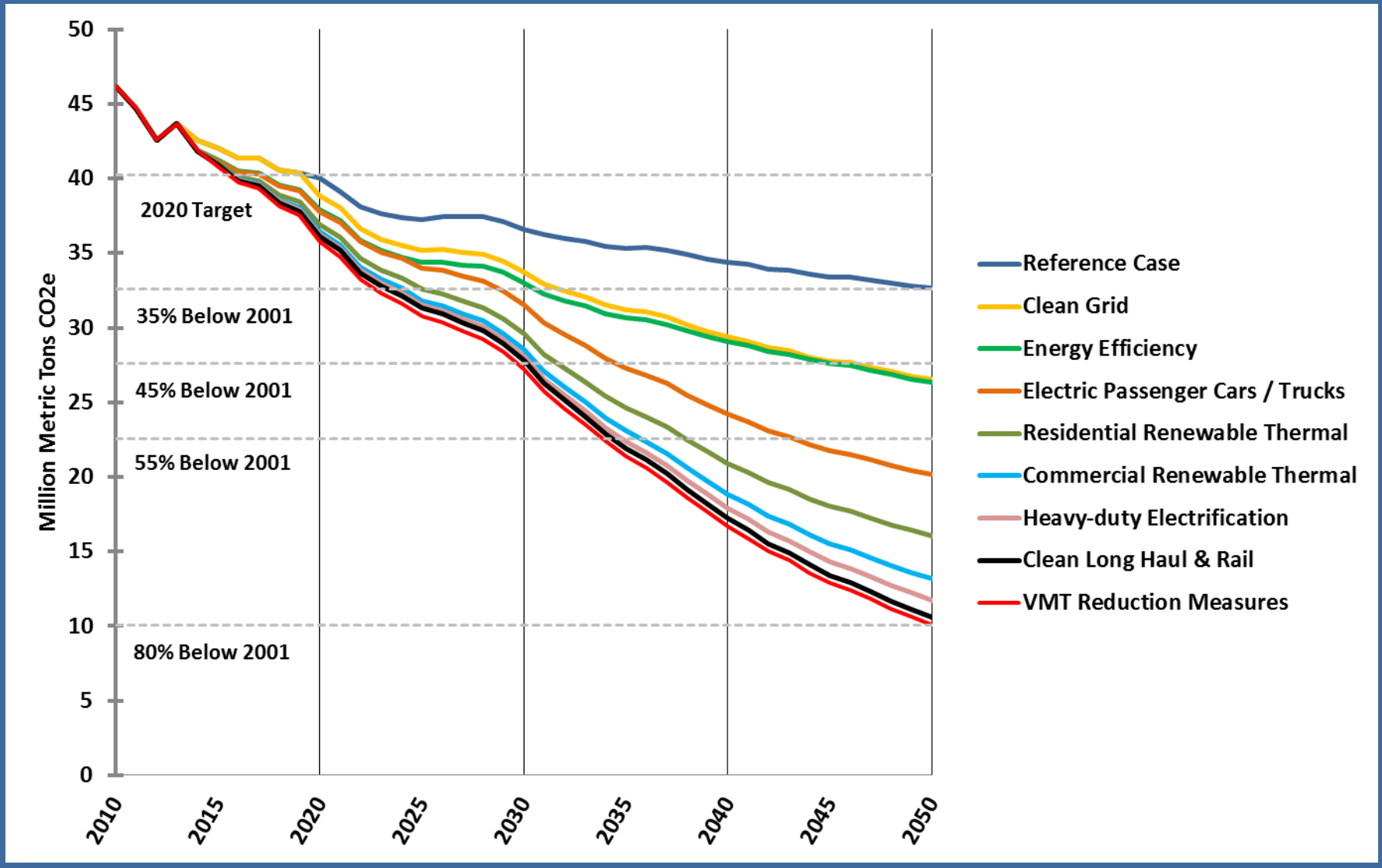
	45% 2030 Mid-Term Target (60% zero carbon)	Sensitivity 1 in 2030 (70% zero carbon)	Sensitivity 2 in 2030 (80% zero carbon)
# of ZEVs	550,000	480,000	430,000
% of Fleet	22%	18%	14%
% of Sales	62%	55%	50%

Variation 2 (RTT and transport equal)

	45% 2030 Mid-Term Target (60% zero carbon)	Sensitivity 1 in 2030 (70% zero carbon)	Sensitivity 2 in 2030 (80% zero carbon)
# of ZEVs	550,000	390,000	280,000
% of Fleet	22%	14%	9%
% of Sales	62%	50%	41%

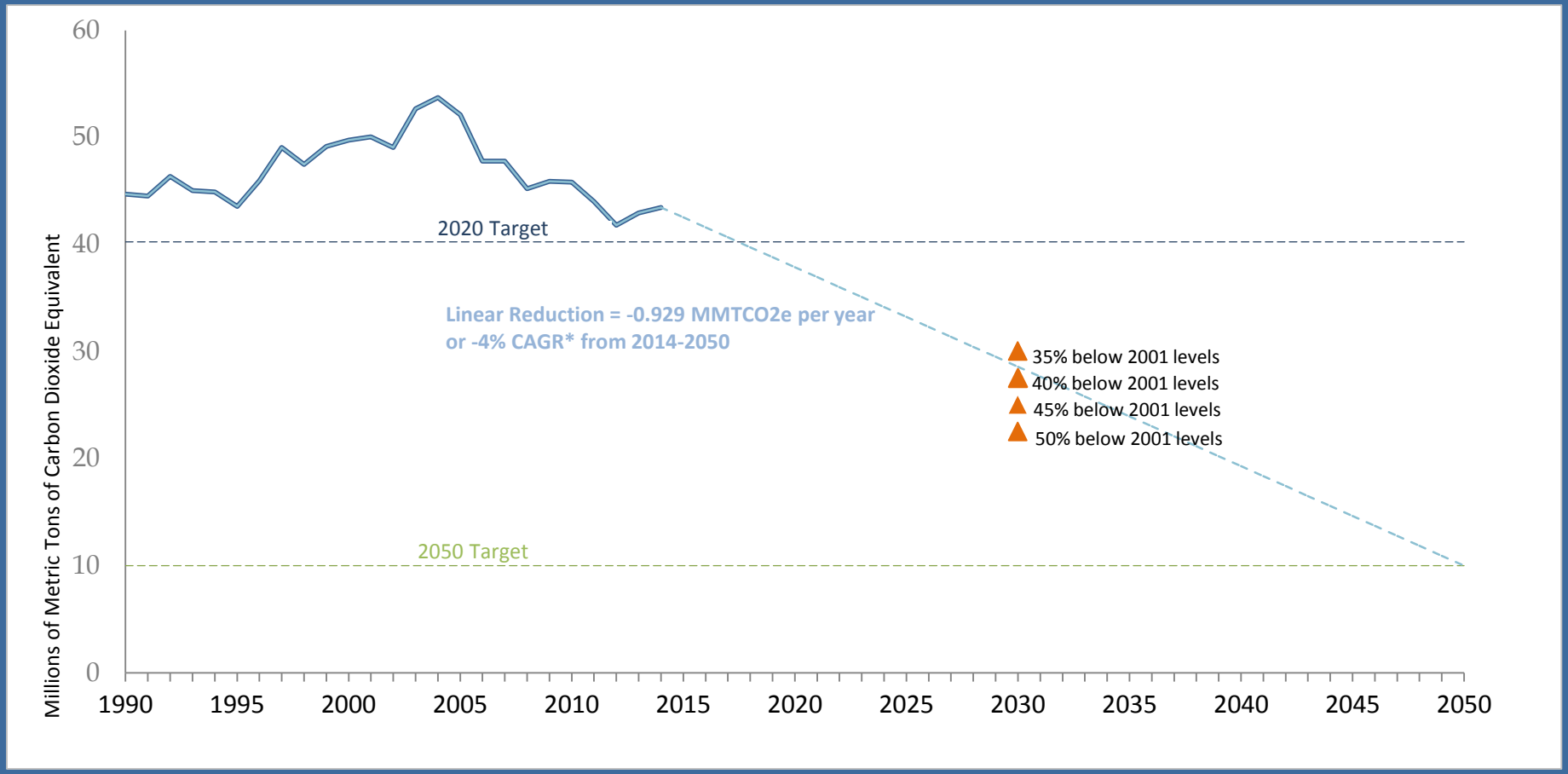
- In each scenario ZEV sales are ~ 100% by 2050
- # and % of ZEVs are rounded
- % of sales refers to annual sales

45% Reduction Target Mitigation Wedges



Discuss Mid-term GHG Reduction Target

Assessment of 2030 Interim GHG Reduction Targets for CT



*Compound Annual Growth Rate (CAGR)

GHG Reduction Targets

	2020	2025	2028	2030	2035	2050
CT	**10% below 1990 levels** (legislative mandate)					**80% below 2001 levels** (legislative mandate)
MA	**10-25% below 1990 levels** (legislative mandate)					**80% below 1990 levels** (legislative mandate)
NY				**40% below 1990 levels** (executive order)		**80% below 1990 levels** (executive order)
NH		**20% below 1990 levels** (aspirational)				**80%below 1990 levels** (aspirational)
RI	**10% below 1990 levels** (legislative mandate)				**45% below 1990 levels** (legislative mandate)	**80% below 1990 levels** (legislative mandate)
VT			**50% below 1990 levels** (aspirational)			**80-95% below 1990 levels** (aspirational)
CA	**A return to 1990 levels** (legislative mandate)			**40% below 1990 levels** (legislative mandate)		**80% below 1990 levels** (executive order)
MN		**30% below 2005 levels** (legislative mandate)				**80% below 2005 levels** (legislative mandate)
WA	**A return to 1990 levels** (legislative mandate)				**25% below 1990 levels** (legislative mandate)	**50% below 1990 levels** (legislative mandate)
NEG/ECP	**10% below 1990 levels** (aspirational)			**Marker Range 35-45% below 1990 levels** (aspirational)		**75-85% below 2001 levels** (aspirational)

Comparative Analysis of Mid-term Targets

State	Baseline Year	Baseline total emissions (MMTCO2e)	Midterm Target Year	Midterm Target %	CAGR* reduction to meet mid-term target from 2014 baseline	CAGR reduction/increase from baseline to 2014
New York	1990	235,840,000	2030	40%	-2.66%	-0.3%
Rhode Island	1990	12,480,000	2035	45%	-2.47%	-0.4%
Vermont	1990	8,110,000	2028	50%	-4.36%	+0.1%
Minnesota	2005	150,000,000	2025	30%	-2.43%	+0.6%
California	1990	431,000,000	2030	40%	-3.29%	+0.1%
Connecticut	2001	50,065,141	2030	**35%**	-2.66%	-1.1%
Connecticut	2001	50,065,141	2030	**40%**	-3.14%	
Connecticut	2001	50,065,141	2030	**45%**	-3.66%	
Connecticut	2001	50,065,141	2030	**55%**	-4.87%	

*Compound Annual Growth Rate (CAGR)

GC3 Survey

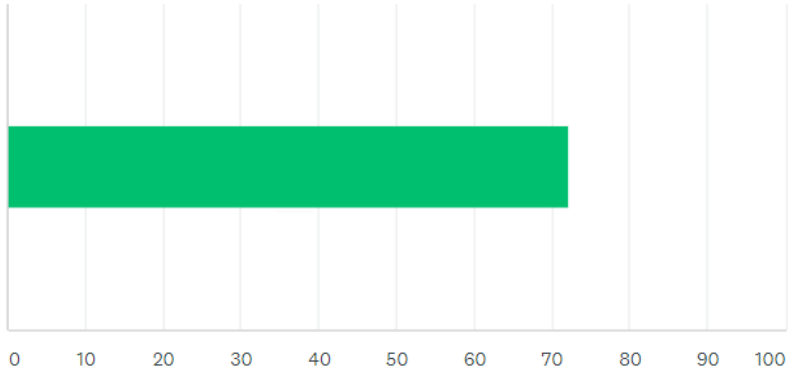
Survey Results and Points of Consensus

- A total of 13 responses
- Achievable, a stretch, ambitious, and equitable all important to survey respondents (range of 72-78)
- Support for both a range and absolute target, with a range receiving slightly more support.
- Consensus around 40-50%, with 40-45% and 45-50% being first and second choices for majority of results.

GC3 Survey

How important is it that the mid-term target is likely to be achieved? 1 - not important and 5 - very important

Answered: 13 Skipped: 0



How important is it that the mid-term target is a stretch target?1 - not important and 5 - very important

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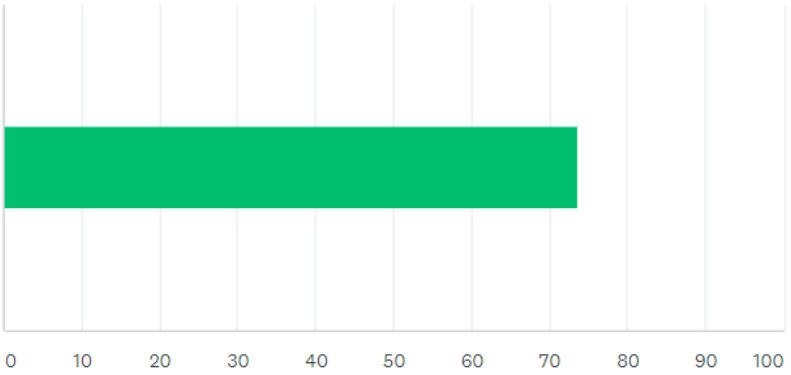

GC3 Survey

How important is it that the mid-term target is ambitious?1 - not important and 5 - very important

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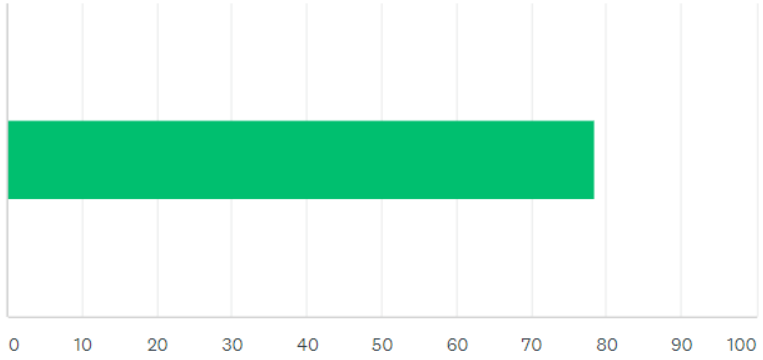
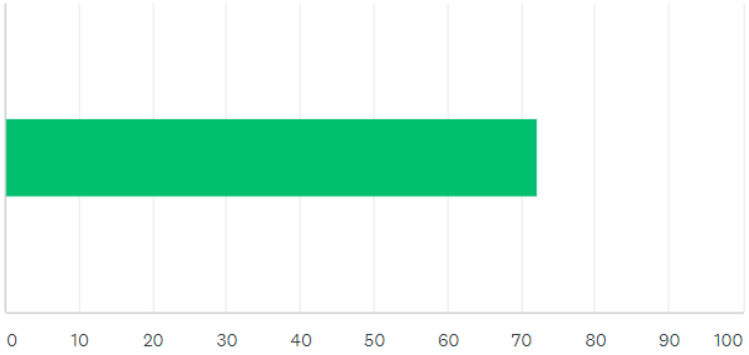


How important is it to ensure the mid-term target achieve an equitable distribution of emissions reductions over time?1 - not important and 5 - very important

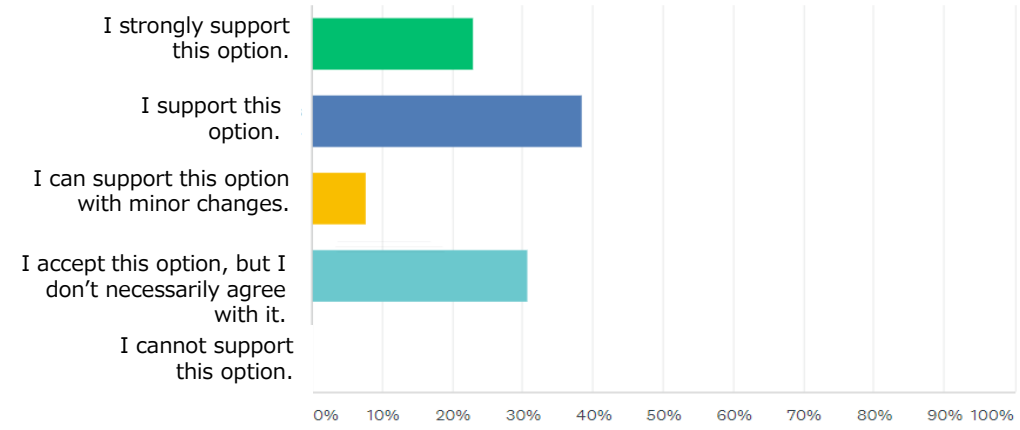
Answered: 13 Skipped: 0



GC3 Survey

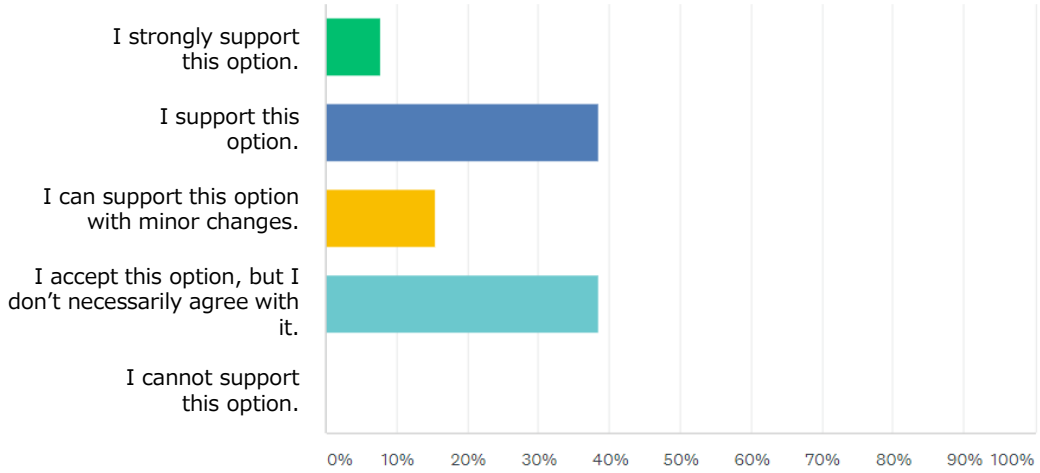
What is your support of setting a GHG reduction target range rather than a absolute number?

Answered: 13 Skipped: 0

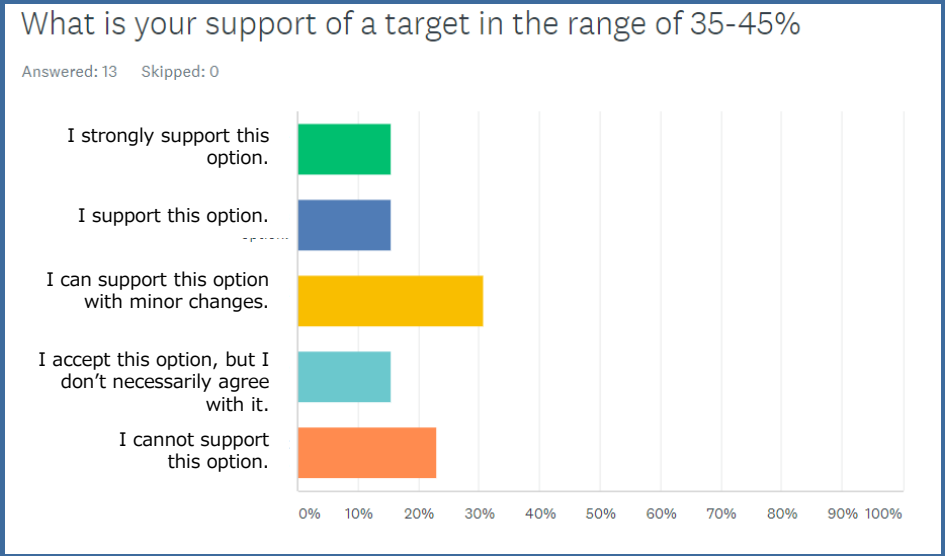


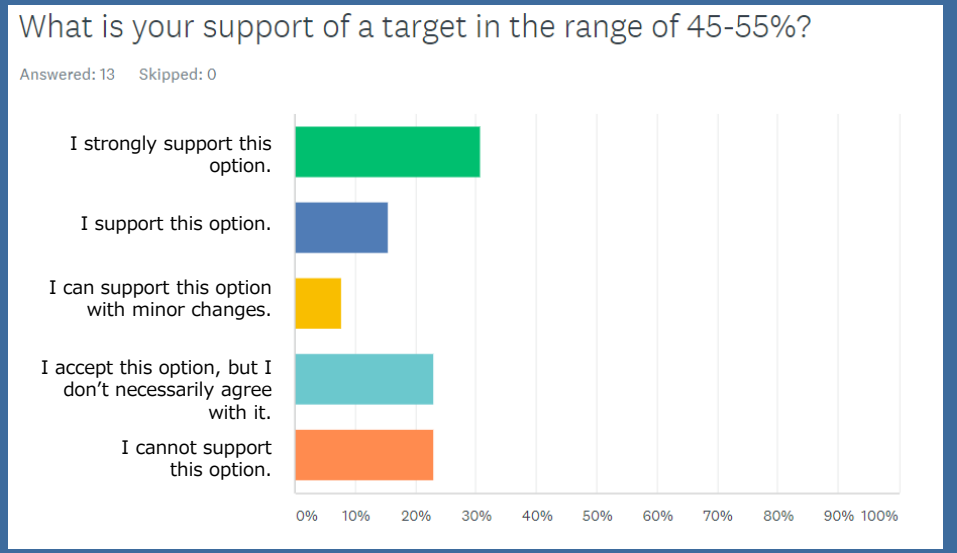
What is your support of a setting an absolute target?

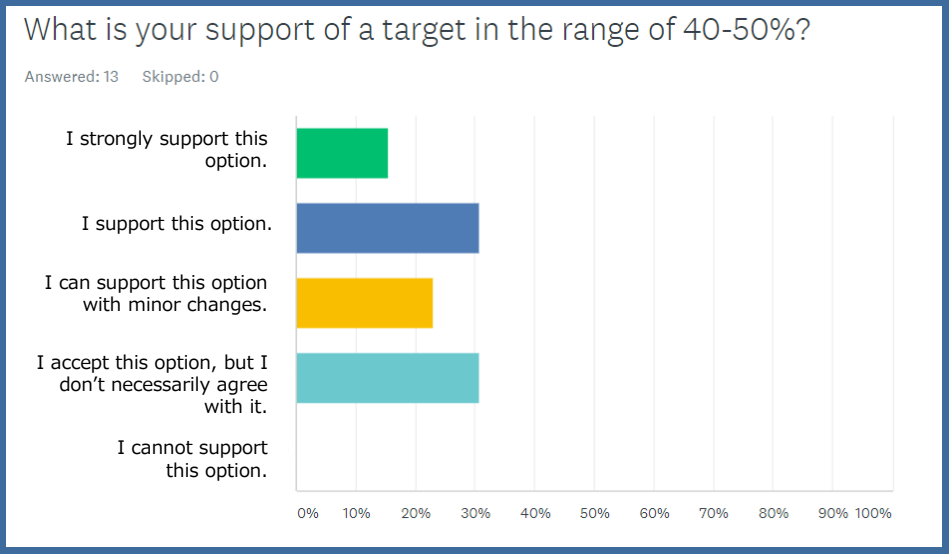
Answered: 13 Skipped: 0



GC3 Survey


What is your support of a target in the range of 35-45%
Answered: 13 Skipped: 0
I strongly support this option.
I support this option.
I can support this option with minor changes.
I accept this option, but I don't necessarily agree with it.
I cannot support this option.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

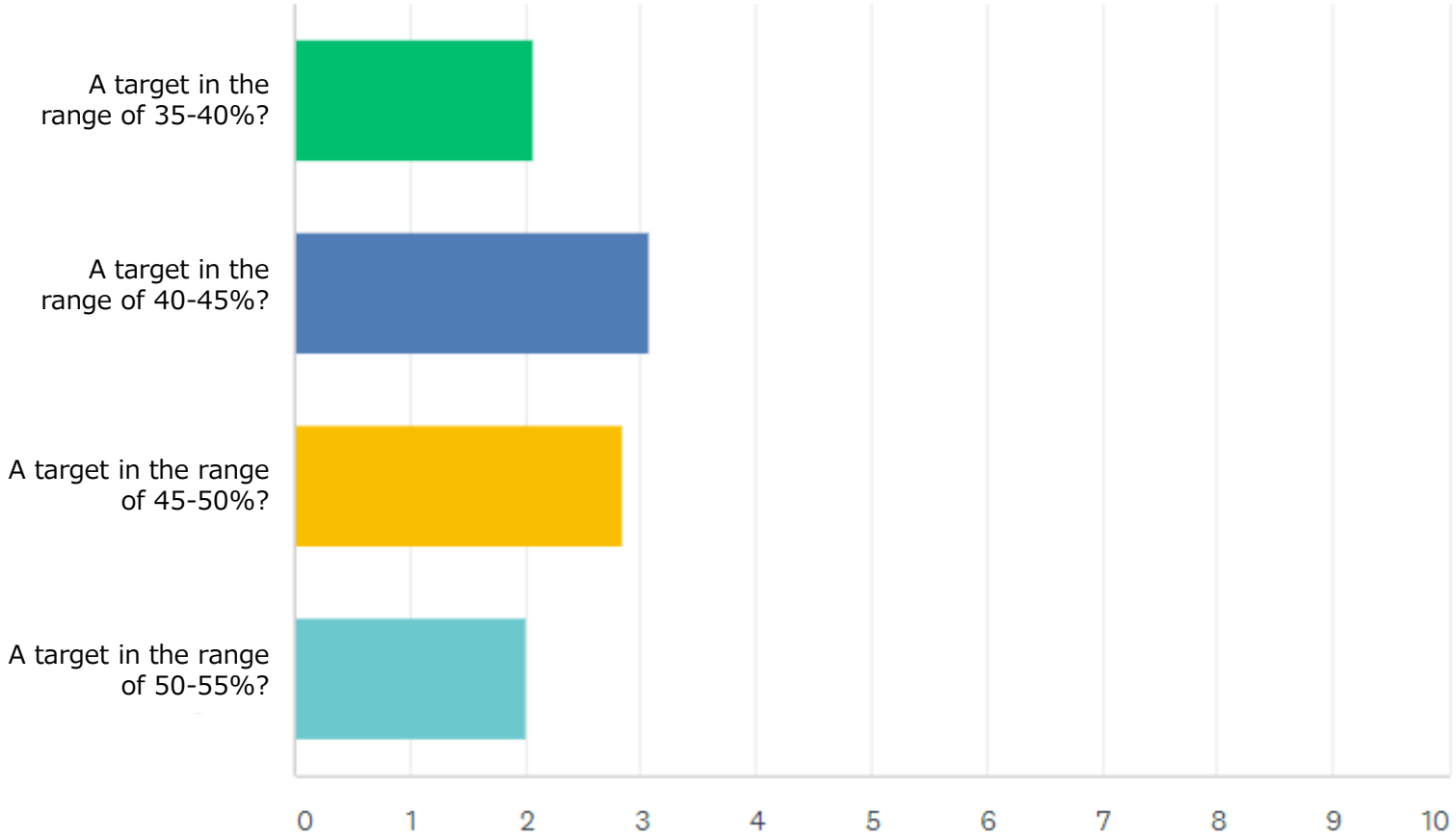

What is your support of a target in the range of 45-55%?
Answered: 13 Skipped: 0
I strongly support this option.
I support this option.
I can support this option with minor changes.
I accept this option, but I don't necessarily agree with it.
I cannot support this option.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%


What is your support of a target in the range of 40-50%?
Answered: 13 Skipped: 0
I strongly support this option.
I support this option.
I can support this option with minor changes.
I accept this option, but I don't necessarily agree with it.
I cannot support this option.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

GC3 Survey

Rank the following target ranges in order of preference.

Answered: 13 Skipped: 0



Public Comments